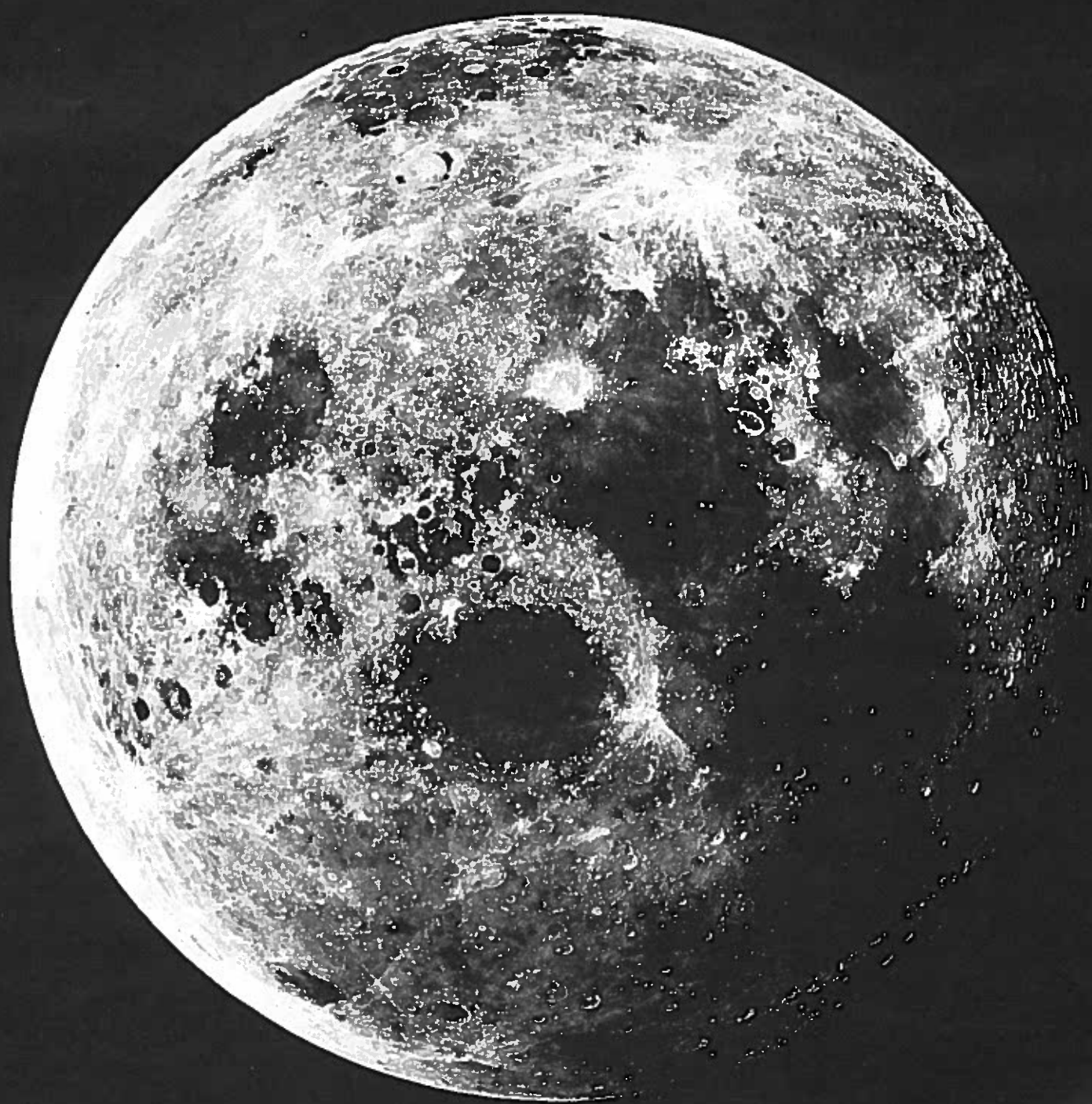


*'We came in peace
for all mankind'*



Many small steps lead to mankind's giant leap

A quarter of a million miles from Earth, between a boulder and a circle of craters, rests the remains of the "Eagle." A plaque attached to one of its spidery legs bears a map of the world and this inscription:

*Here men from the planet Earth
first set foot upon the Moon
July 1969 A.D.
We came in peace for all mankind*

It is a small memento to a monumental human achievement. A decade ago, the United States of America fulfilled the dreams and aspirations Man held through countless centuries. On Sunday, July 20, 1969, Apollo commander Neil Armstrong guided the Grumman-built Lunar Module down to the Moon's dusty surface. Hundreds of millions listened as he announced: "Houston. Tranquility Base here. The Eagle has landed."

Today, many Grummanites can vividly recall where they were at 4:17 p.m. that historic day and that exhilarating feeling of accomplishment and pride. It was their job to design the Lunar Module; it was their craftsmanship that built the LM; it was their meticulous efforts that helped make Apollo XI an out-of-this-world success.

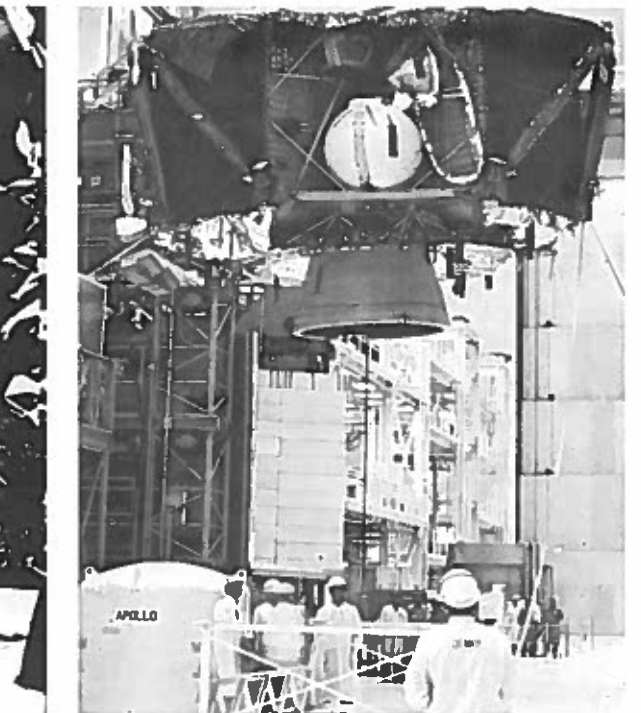
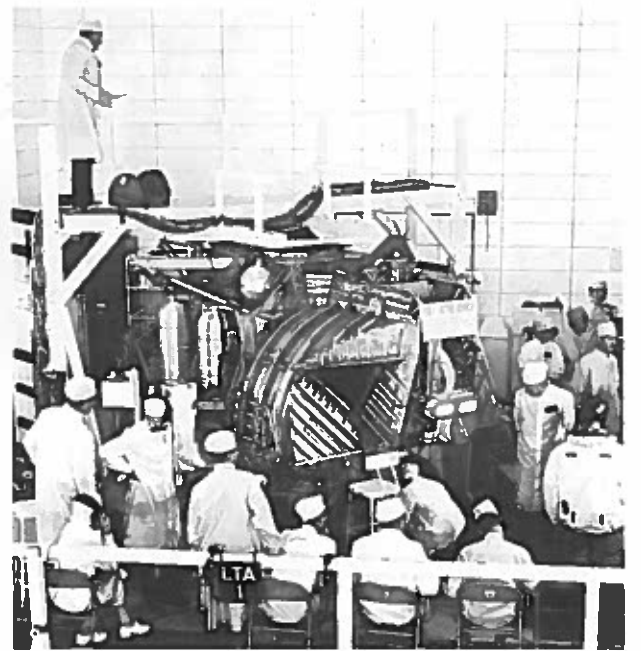
Of course, these Grummanites didn't do it alone. In just eight short years, the talents of more than 300,000 people in 20,000 companies had been tied in to a single, peaceful national mission.

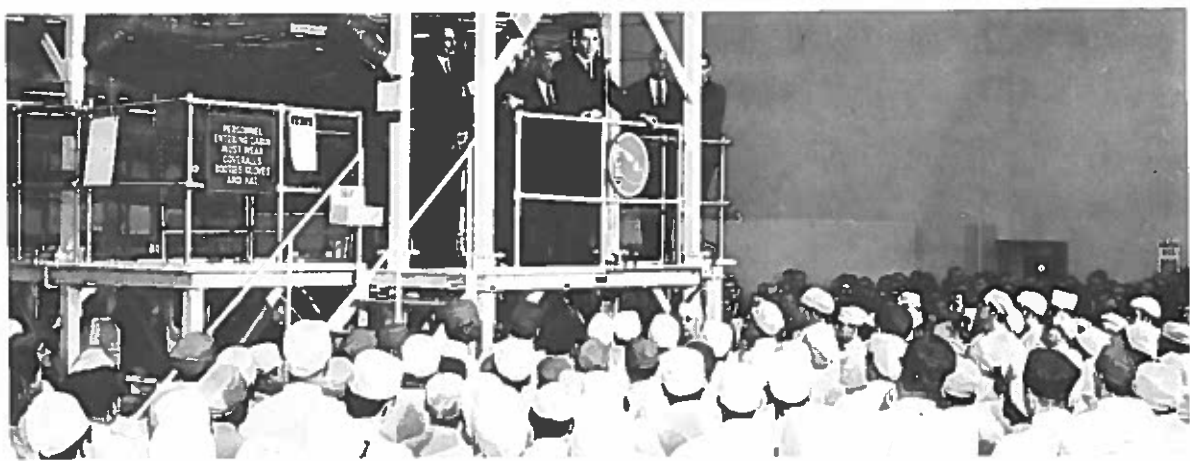
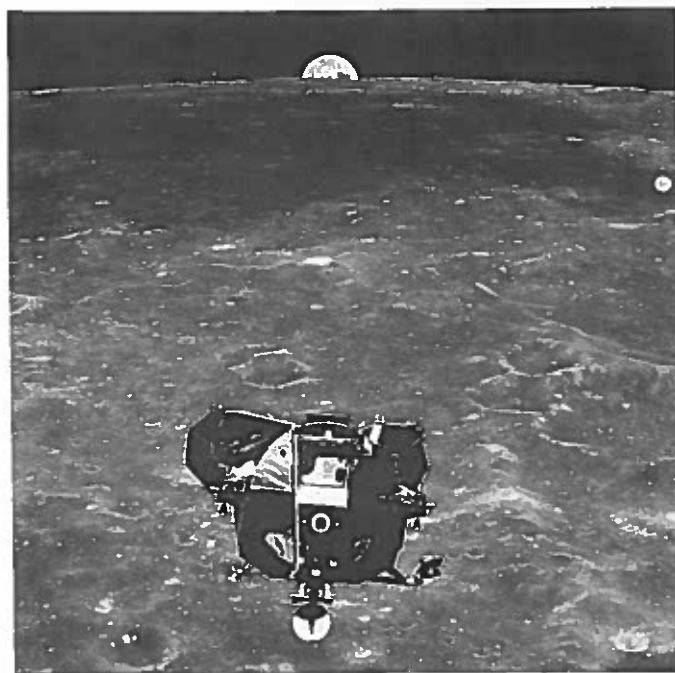
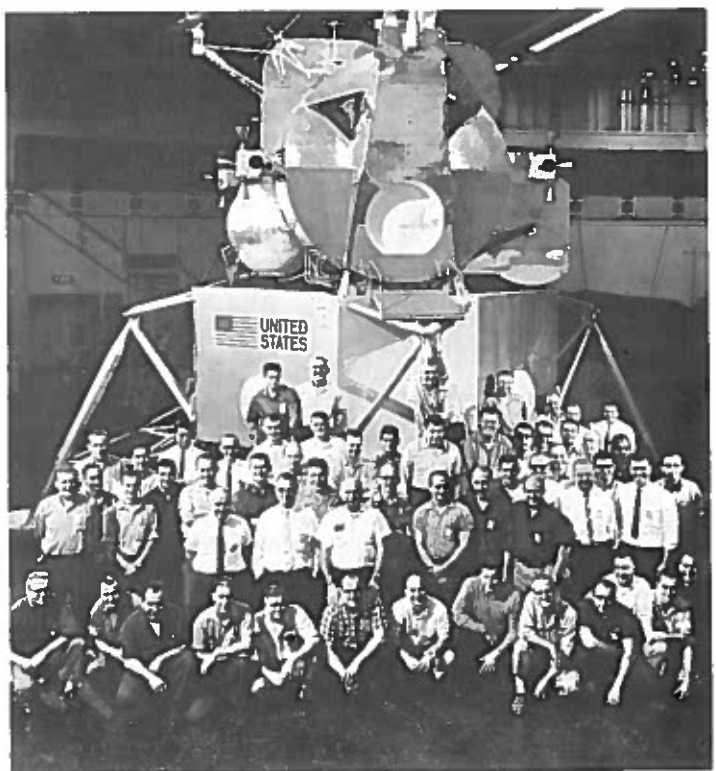
Humble beginnings

At the outset of the nation's manned space program, Grumman had a little trouble getting its foot in the door. A small group of Grumman engineers began thinking about manned space projects as far back as 1958. In mid-1960, Grumman's first, preliminary study on Project Apollo was submitted to NASA (National Aeronautics and Space Administration). At that time, the most popular theory was that of a Command-Service Module going straight to the Moon. Then NASA held a competition. Teamed with ITT, Grumman presented a follow-up study of Apollo in October 1960. It lost the competition.

But the Grummanites kept plugging away. In October of 1961, Grumman once again entered a competition. This time it teamed with General Electric on the Command Module proposal. It lost that one, too.

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But in early 1962, Joe Gavin, Tom Kelly and others started developing the Lunar Orbit Rendezvous concept. Then NASA decided to hold a competition for LM. With RCA as prime subcontractor, Grumman submitted its proposal in September. Two months later, Grumman heard the news — it would build the Lunar Module that would take man to the Moon.

As the LM team began taking shape, it became apparent that this would be like no other Grumman program in the past. Reflects Grumman Corporation President Joe Gavin (then Vice President-LM program director): "We found ourselves working in a highly visible national program. The LM was only one part of a much larger undertaking and we were constantly conscious of the fact that we had to keep pace with every other Apollo team member. If we didn't we would cause a slippage that the entire nation — the entire world — would know about."

The design of LM also unearthed new challenges. Says Tom Kelly, Vice President of Engineering, "When we began the LM Program it was to be the first 'true' spacecraft. Unlike the Command-Service Module, LM was to operate only in an outer-space environment. We had no past experience in that field to draw on."

Engineers and scientists engaged in the Apollo Program went through a tremendous learning process during those early LM years. One engineer says: "In the beginning, anyone who worked even just a few months on a rocket proposal was considered an expert. Many of us went back to school to catch up on the latest space technology. Everybody shared what knowledge he had. Aerospace has been called the leading edge of technology. During those LM years, you knew you were on the front lines."

Because no one had ever done anything similar

before, there were some who thought it was an impossible task.

How did the people of Grumman hack one of the most demanding jobs in technological history?

It was the spirit of pride and will to win that filtered throughout the Grumman LM corps.

It could be seen at Cape Kennedy in Florida as early as 1965. Grumman Aerospace Chairman and President George Skurla was Kennedy Space Center Operations director during the sixties. Recalls Skurla, "Site activation was a very critical time for us. For months and months we ran night and day installing, validating and tying various equipment into the entire NASA complex at KSC to make sure that when the first LM arrived from Bethpage, we'd be ready. I, for one, never lived through a more demanding period in my whole life."

But it was only a dress rehearsal for what followed. In June 1967, the Grumman team at the

Cape received its first LM and the pressure increased.

A similar “nothing but the best” attitude could also be found in the southwest at NASA’s White Sands, New Mexico site. There Grumman set up a propulsion test facility in early 1964. A year later, some 300 people were there wearing Grumman badges. Work was hazardous with simulated firings at 120,000 feet, altitudes at which a nozzle fires as it would in space. Over a three-year period, there were 14,000 seconds of firing time for the descent engine and 8,500 seconds for the ascent.

Meanwhile, a Grumman contingent led by Grumman Houston President Jack Buxton set up shop at Johnson Space Center in Houston. Their mission: to prepare the Lunar Module for a series of manned tests at the NASA site that were a necessary preliminary to manned space flight.

Because of the highly hazardous nature of the manned testing at Houston, propulsion testing at White Sands, and launch operations at KSC, an entirely new set of stringent safety standards had to be followed to guard against any possibility of disaster.

The nit-picking, the frustration, the super-caution were well worth it. Such testing is dangerous business, but Grumman completed the

‘I never lived through a more demanding period in my whole life’

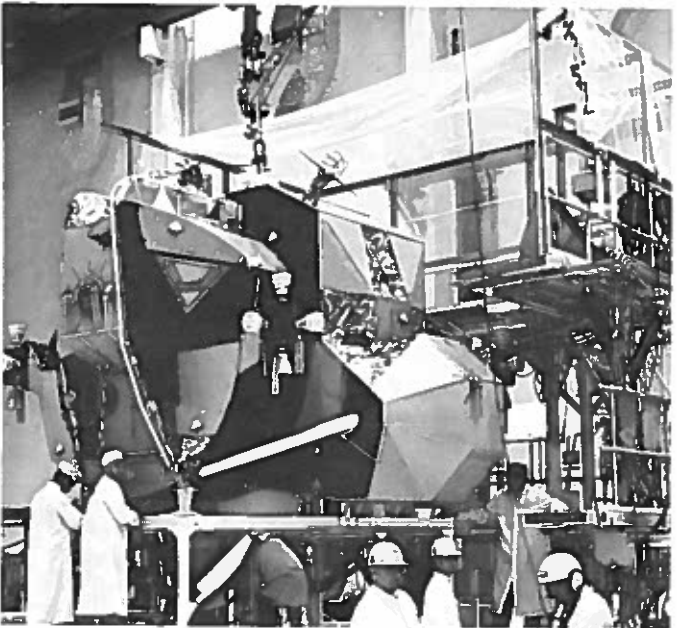
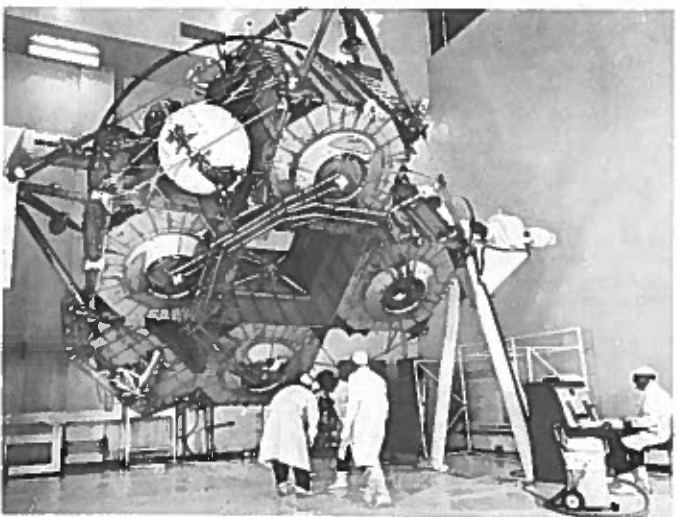
Apollo program with an outstanding record in safety — one that was cited by NASA several times.

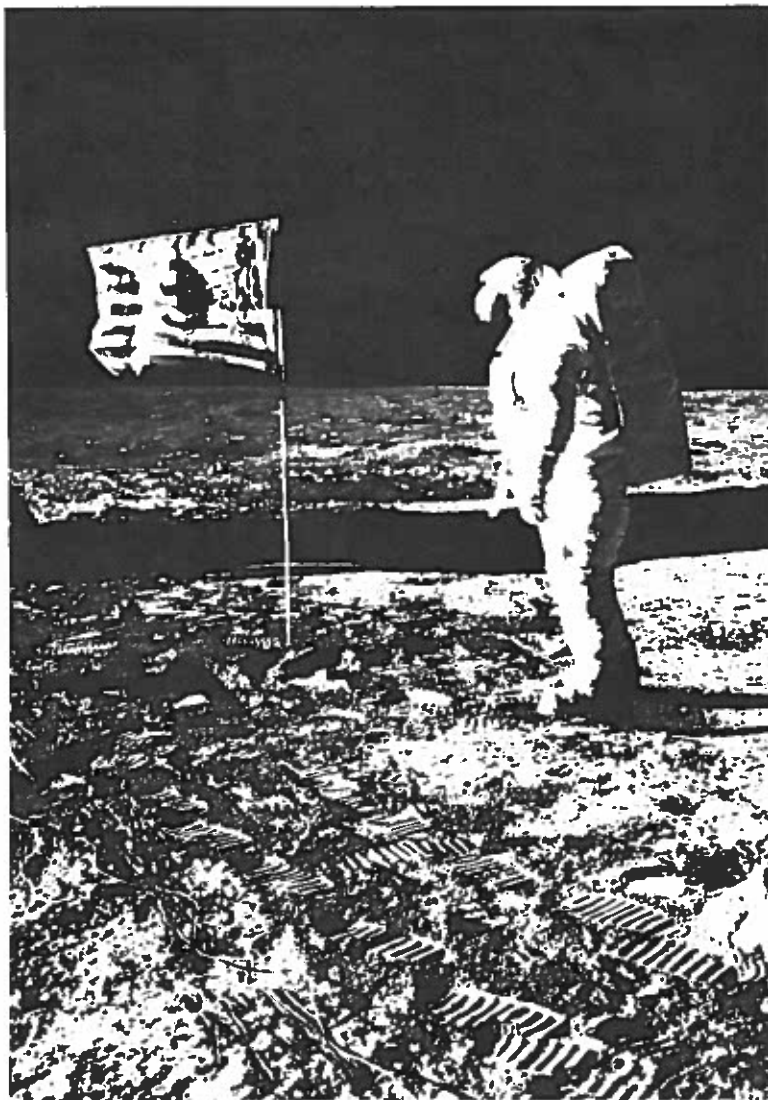
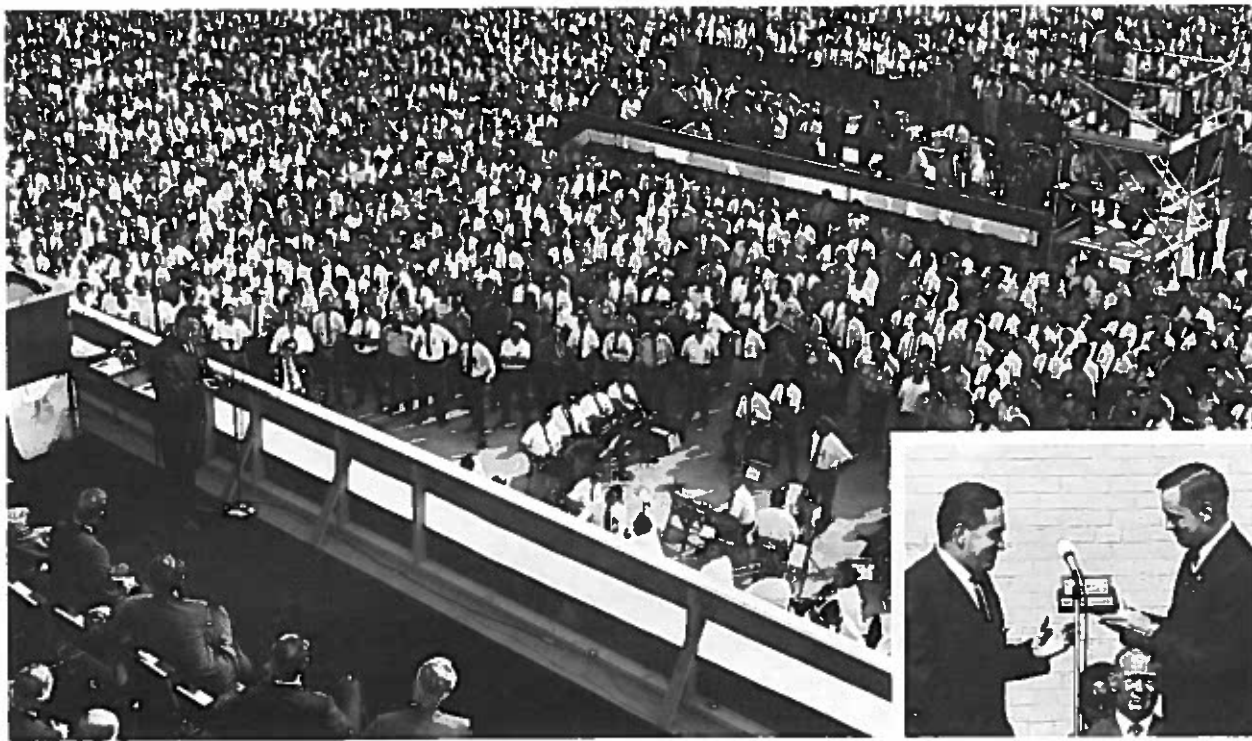
As the decade began to draw to a close, the pressures were unyielding. Seven days a week, Grummanites worked. Stringent manufacturing and assembly standards were established. Cleanliness became an obsession. New techniques were developed to guarantee faultless operation during the space voyage.

Pressure rises

The nation and the world were watching. As that fact became more and more evident, greater and greater pressures and demands were placed on just about every Grummanite working on the LM Program.

But that feeling of camaraderie only





strengthened as the pressure mounted. One manufacturing supervisor recalls: "We were all committed to delivering a quality product on schedule and launching it on time. When anything went wrong during production, no one thought about placing the blame — the big concern was fixing the problem. Mistakes were admitted — everyone knew that a mistake that went unadmitted or unnoticed might have meant a one-way ticket for those astronauts. That was foremost in everybody's mind."

As the launch date for the first lunar landing neared, there was even more testing, re-checking and re-examining. No one left room for error.

As those final hours approached on July 20, 1969, Joe Gavin stated: "A great many people who have put out an extraordinary effort in the last five to seven years will be hanging on every second of this mission."

And that they did. When Neil Armstrong switched to manual pilot control on his approach to the lunar surface, Grummanites were among the millions who were riveted in front of their television sets. Would the descent engines work? Some counted the seconds (space flight fuel is measured in seconds). Then Armstrong set the LM down on the Sea of Tranquility.

A few hours later, as he stepped on to the lunar surface, Armstrong proclaimed: "That's one small

'Apollo was more than three men going to the moon... it was America, it was the world'

step for a man; one giant leap for mankind." Man had at last set foot on another celestial body.

Upon successfully returning to Mother Earth, Neil Armstrong and Buzz Aldrin personally stopped at Bethpage to thank the Grumman team. At a gala homecoming celebration, Armstrong said, "We didn't come to make speeches, but just to congratulate you for your excellence and to thank you for giving us one grand spacecraft."

Added Aldrin: "Apollo was more than three men going to the moon, more than the government and industry teams — it was America, it was the world."

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The way it was

The LM era was a very special time for the people at Grumman. We couldn't interview the thousands of men and women who helped make history happen; but here, nine Grummanites recall what it was like to be part of the team.

It's got to be the happiest face you've ever seen; the arm outstretched to grasp the hand of a co-worker, the feeling of triumph complete.

The grinning engineering manager at Bethpage Mission Control in this 1969 photo is John Coursen. "I guess it was about twenty after four when that picture was taken. We had just heard Armstrong's words, 'The Eagle has landed'."

Coursen recalls that the 45 people at Mission Control went running around, slapping one another on the back, shaking hands, passing out cigars.

"But then it was right back to work, preparing for the next hurdle," says Coursen. The Mission Control room in Plant 25 was a back-up system, directly linked to Mission Control in Houston. "When problems came down from the flight director in Houston, we received the same information and tried to work out solutions here where more back-up details were available."

'The agony and the ecstasy...'

"It seems like such a long time ago that we were caught up in all the excitement, racing the Russians to the Moon," says George Skurla. Skurla was director of Operations at Cape Kennedy 10 years ago, responsible for the 1,600 Grumman men and women who worked there on the Lunar Module program. It was the largest field operation in Grumman's history.

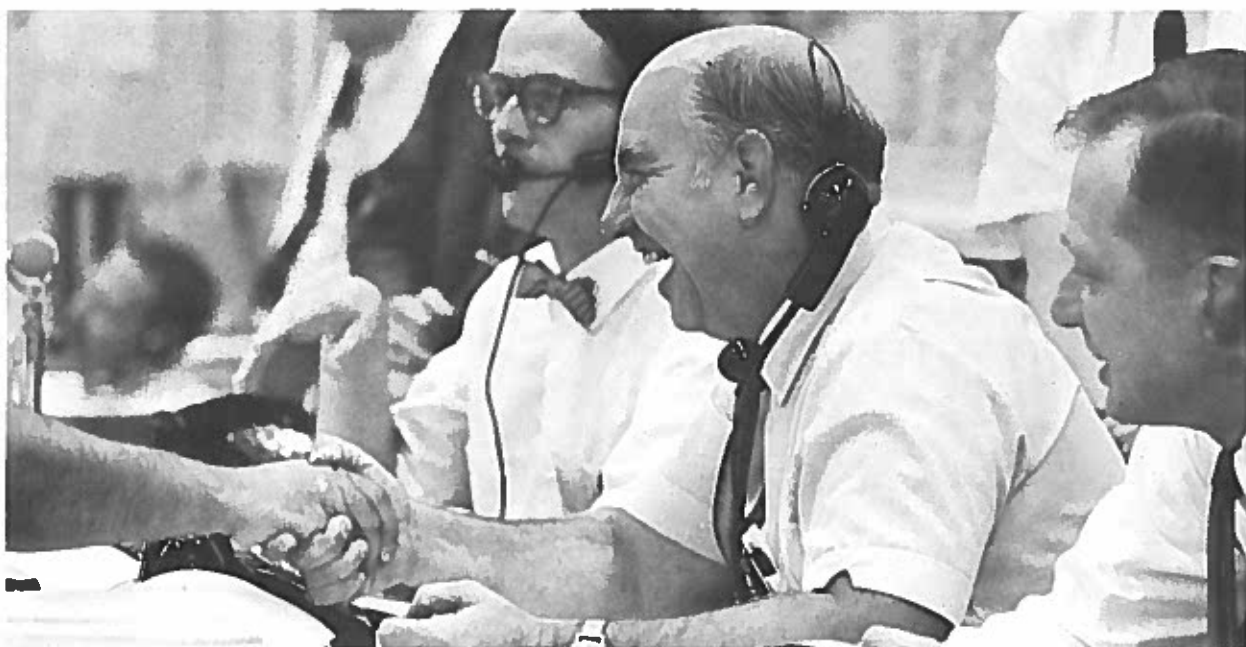
"Whenever there's a full Moon, I still look up and stare at that thing, remembering what those days were like."

Skurla talks about "the agony and the ecstasy" -- the agony of working 70 and 80 hour weeks; weeks of constant concern and grueling effort.

"We were the last major contractor to hit the Cape," says Skurla. "We had to come up to speed and prove ourselves to NASA. Everything had to be ready to go operational immediately; and the job of packaging our team and our skills was the biggest challenge we had ever faced. Personally, I think I learned more about the discipline of good technical management during those five years than in the previous 20.

"But the ecstasy was the thrill of seeing the Apollo 11 blast off and the completion of a flawless mission. It was the most satisfying program I ever worked on.

"Our crew was an unbelievably dedicated bunch, and, according to NASA, they were the



Beyond all the excitement, Coursen recalls the enduring effort and enthusiasm poured into the program. "There was this underlying, driving force that kept everyone all keyed up. The commitment was shared; no one wanted to be responsible for anything going wrong with the LM, no matter how slight."



best Apollo pre-launch team at Cape Kennedy. That was quite an achievement, because none of us had any Cape experience. Our guys worked hard; they were brash, they were opinionated, but they were good.

"The nerve-racking nature of those times is something I wouldn't want to live through again," says Skurla. "But we all had this tremendous goal. President Kennedy had galvanized the country into action with the idea of landing a man on the Moon before the end of the decade. The Apollo program proved the ability of the United States to orchestrate a government-industry team to achieve a national goal.

"Wouldn't it be great if that kind of team went to work on today's energy problems?"

"I see signs again of that same undercurrent - the need to work on something new and exciting - in our Fusion Energy program," says Coursen who manages that project.

"But it's not like the LM days; not quite the same thrill. I'll never see anything like that again in my lifetime."

'The stakes were that high'

The Apollo years were a tough challenge for the LM Quality Control team. "We were dealing in a totally different environment than the aircraft world," says Joe Kingfield, former LM Q.C. manager. "New specifications had to be developed and detail quality procedures prepared and implemented for a manned space vehicle. A thumbprint, dropped washer, dirt, water glycol spill not properly cleaned might have jeopardized the mission and the safety of the crew. Thousands of parts were scrupulously cleaned, inspected for contamination and then bagged in plastic until assembly."

In the LM Plant 5 final assembly area, a huge fixture was used to rotate a LM stage to assure that there were no foreign objects in the LM. "One time we heard this clunk ... clunk sound. It sounded like a pair of sneakers in a clothes dryer. We thought someone hadn't properly installed and secured an expensive piece of equipment. We later found that a technician left a "Simpson" meter in one of the rock boxes that he would use after lunch break."

To prevent such mishaps from occurring, Q.C. monitors checked each person and each piece of equipment that went into the LM. When each person exited the cabin, the monitor would again make sure that each piece of equipment, each tool brought in, was either brought out or accounted for. "To this day, we don't know what happened to

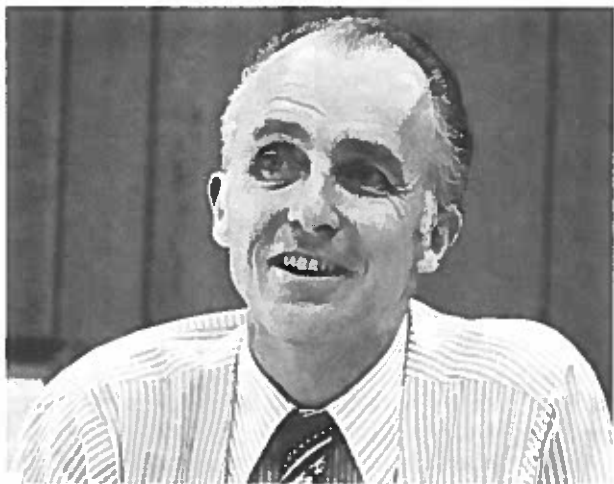


one extension cord. We're sure it didn't go to the Moon, but we can't account for it in the books," Joe says sheepishly.

Joe admits detail routine inspection operations and cleanliness monitoring became an obsession. "But you had to do it. Mistakes couldn't be tolerated. It was like teeing up a golf ball and knowing you had to make a hole-in-one at each hole. The stakes were that high."

Joe Kingfield is director of Corporate Quality and Safety Operations.

'Overwhelming feeling of pride'



Joe Gavin remembers President Clint Towl's remark after presenting the company's winning LM proposal to NASA. "Are you sure you know what we're getting into?" Clint asked.

Reflects Gavin, "Looking back I can honestly say that none of us really understood the pressures that would prevail later ... the worldwide coverage ... the jubilation of playing a major role in an out-of-this-world event."

Gavin recalls those hectic, exciting days of Apollo with "an overwhelming feeling of pride in the team

and accomplishment." It was the spirited teamwork at Grumman and across the nation that pulled off the amazing technological feat, he remembers.

But Gavin firmly believes that most Americans don't hold his opinions on the accomplishments of the Apollo program. "The American public looked at Apollo as a great television show, but the program began losing ratings even before it ended. By contrast, people in other nations have a continuing interest in space. Apollo produced a reputation for the United States which actually is unappreciated by our own citizens."

Looking back, Gavin sees President Kennedy's public commitment to put an American on the moon before the end of the sixties as "a very daring attempt, considering how little we knew about space travel at that time. It took great imagination and fortitude to make that kind of commitment."

Can the nation tackle today's problems as it did in landing a man on the moon in the sixties? "It takes leadership ... confident, imaginative leadership."

"We have the technology to tackle most problems. What we need is a national commitment and a change in attitudes," Gavin asserts.



'It was like an operating room'

Charles Ballweg learned an important lesson while working on the LM project: Cleanliness is next to godliness.

Ballweg was one of two men who built the tool pallet that was carried on the Lunar Rover. The pallet held a brush, a shovel, a rake to pick up moon rocks, bags to store lunar samples, and other needed equipment.

Ballweg donned a white smock each day before work began. Once the pallet had been assembled and painted, he had to wear white cotton gloves whenever he handled it. "As soon as the gloves were the least bit soiled you had to get a new pair."

The men built the three-foot by four-foot pallet from scratch, making the detail parts from aluminum and putting it all together with bolts, rivets, or adhesive bonding materials.

The emphasis on cleanliness extended to the entire work site. "The floor was sparkling and nothing was ever left laying around," says Ballweg. "It was like an operating room; after work was over for the day, you had to account for all your tools and anything else you used."

But all of this extra effort and care was well worth it as far as Ballweg was concerned. "When I watched the landing on television, I could actually see the astronauts using my tool pallet."

Charles Ballweg is a structural mechanic in the Product Development Operations Center.

'...supremacy of US technology'

On Sunday, July 20, 1969, Tom Kelly was too busy working at Houston Mission Control to think about the significance of the historic lunar voyage. "I didn't have time to think about anything," he says. "I never thought of it as an historic event until it was all over."

As project engineer, as engineering manager and as manager of final assembly and test operations on the LM program, Kelly was largely responsible for the concept and design of the LM. NASA officials have referred to Kelly as "the father of the Lunar Module."

"The Apollo program was an outgrowth of the sudden fear on the part of the American people that we were losing our technological edge to the Russians. Apollo was a way of demonstrating the supremacy of American technology."



But, he says, the confidence is now gone and the country no longer looks out to space. "You have to be a vigorous, confident country to explore and right now we're neither vigorous nor confident."

"We need to build our confidence again. To explore space you have to make such a large commitment and if you don't have an outgoing, confident view of the world you can never make that kind of commitment. If you are preoccupied with nicker-and-diming, and proposition 13s, you are not going to reach out to the Moon and the stars."

"I listened to a tape of President Kennedy's inaugural address a few months ago, and it is astonishing to see the difference in tone compared to what national leaders are saying today. We were sure we could confront the rest of the world in just about any field of endeavor and show them the way. We don't believe that we can do that anymore. When we get to the point where we think we can do that, then we'll go back out in space again."

'Worked for a common goal'



As a member of the negotiating team for the LM contract, Ozzie Williams recalls a three-week stretch in 1962 as a signal of things to come.

"NASA was still building its facilities down in Houston, so we met in a motel to negotiate the contract. It was horrible weather. By the end of three weeks, most of us had laryngitis. One of the last days, I remember walking outside to go to yet another session and saying to myself, 'What more can they ask?'"

It was only a sign of what was to come. Ozzie became manager of Reaction Control Subsystems and six-day, even seven-day weeks, became routine.

"Our propulsion system had to work consistently. The 16 little jets were installed to guide the LM to and from the Moon."

It was that system that paid off admirably in the Apollo 13 mission. "Our jets were used to steer the crippled Command-Service Module.

"The LM Program was unique. Everybody across the nation worked for a common goal," says Ozzie. "It was an enormously self-motivated team. Individualism was left behind. We worked as a unit."

Ozzie Williams is Grumman International Vice President-Africa.

'Still reaping the benefits'

"The whole world was watching; there were no second chances, and everyone at Grumman felt that pressure," says Ralph "Doc" Tripp, who was then LM program director.

"But people seemed to thrive on it; you didn't have to motivate them to get things done," remembers Tripp. "They were pushing themselves to do the best job they could, working long hours to the point of exhaustion. I can remember walking around here telling people to go home."

The LM program attracted good people — dedicated, meticulous workers — and it brought out the best in them. "The national goal was to get a man on the moon, and people at Grumman saw their jobs as important and significant. We scheduled family days here every so often so that they could show their husbands, wives, and kids what they were doing. You could just see pride written all over their faces."

But for Tripp, the astonishing thing about the way those Grummanites worked was that they knew that as soon as the last space shot was completed, they'd be out of a job. "We were always working against deadlines; and they did their best to beat those deadlines, even though it would hasten their own unemployment.

"We had to let about 10,000 people go when the program was over," Tripp recalls.

Tripp regrets that the space program tapered off as abruptly as it did. "A lot of people in this country got the idea that we were throwing money away in space. But as the saying went at that time, the astronauts didn't leave any money on the moon; all that money was spent here. We're still reaping the benefits of what we learned then: in medical technology, electronics, communications, and countless other fields.



"After seeing what we could accomplish on the LM program, I guess I'm disappointed at how slowly things have moved since then," says Tripp. "For example, the plan to build solar reflectors 20,000 miles above the earth to beam back the sun's energy — I think we should be pushing much harder for that.

"You really can do anything if you try hard enough," says Tripp. "That's the most important thing we learned when we walked on the Moon."

Ralph "Doc" Tripp is Vice Chairman of Grumman Allied Industries, Inc.

'We had to be perfect!'



"Though I never worked so hard in my life, I never enjoyed it more," says Joel Taft. He was a "troubleshooter" at Kennedy Space Center, working as a site engineer for Integrated Logistics Support.

"We knew we were the last stop. We were the final checkpoint. When we did our work we had to be perfect. There was no tomorrow. Once the rocket left the pad, that was it."

Taft recalls working 12-hour-day weeks. "Sometimes I worked around-the-clock. Everybody wanted to do whatever had to be done. We were really charged up to get the job done right."

Taft smiles when he recalls the morning of the Apollo XI launch. "Of course we wanted to get as close to the launch pad as possible. We were using a government car attached to our department and as we passed the center's headquarters, out came the vice presidential party to see the launch. We ended up in back of the convoy and all the guards kept waving us through. We drove right up to a front-row view of the whole thing."

Joel Taft is ILS representative in the Product Development Operations Center in Plant 5.

Step by step: Man's first voyage to Moon

Wednesday, July 16

9:32 a.m. EDT — On schedule, Apollo XI blasts off from launch pad 39A at Cape Kennedy, Florida. On board are Apollo commander Neil Armstrong, Lunar Module pilot Ed "Buzz" Aldrin Jr., and Command pilot Michael Collins. Destination: Moon.

2:49 p.m. — While the spacecraft moves farther from Earth, the LM "Eagle" is unpacked from its compartment atop the launch rockets. Explosive bolts are fired. The main-ship "Columbia" separates from the LM compartment. The astronauts turn the ship around and dock head-to-head with the "Eagle."

Thursday, July 17

7:31 p.m. — Astronauts begin first scheduled color telecast, showing Earth from a distance of 128,000 nautical miles.

Friday, July 18

4:40 p.m. — Spacecraft is 175,000 nautical miles from Earth and 48,000 miles from Moon. While on tv, the hatch to the LM is opened, and Armstrong and Aldrin squeeze through the 30-inch wide tunnel to inspect it.

Saturday, July 19

12:58 p.m. — Mission Control: "We're 23 minutes away from the LOI (Lunar Orbit Insertion) burn." Seconds later: "You are go for LOI." Aldrin replies: "Roger, go for LOI."

6:57 p.m. — Armstrong and Aldrin crawl through the tunnel into the LM to give it another check. The spacecraft is orbiting the Moon every two hours.

Sunday, July 20

9:27 a.m. — Aldrin crawls into the LM and starts to power-up the "Eagle." About an hour later, Armstrong enters the LM and together they continue to check the systems and deploy the landing legs.

1:46 p.m. — The landing craft is separated from the Command



Apollo XI crew. Members of the historic moon voyage ten years ago were Apollo commander Neil Armstrong (L), Command Module pilot Mike Collins, and Lunar Module pilot 'Buzz' Aldrin(R).

Module. Collins continues to orbit Moon in Columbia.

3:08 p.m. — Armstrong and Aldrin, flying feet first and face down, fire the landing craft's descent engine for the first time.

3:47 p.m. — Collins reports his comrades are on the way down to the lunar surface. "Everything's going just swimmingly. Beautiful" Collins reports.

4:05 p.m. — Armstrong throttles up the engine to slow the LM before dropping down to surface. The landing is not easy. The site they approach is four miles from the target point, on the southwest edge of the Sea of Tranquility. Seeing that they are approaching a crater about the size of a football field and covered with huge rocks, Armstrong takes over manual control and steers the craft to a smoother spot. His heart-beat has risen from normal 77 to 156.

When the 68-inch probes beneath three of the spacecraft's four footpads touch down, flashing a light on the instrument panel, Armstrong shuts off the engine.

6 p.m. — With everything in order, Armstrong radios a recommendation that they plan to start the EVA (Extra Vehicular Activity), earlier than originally scheduled, at about 9 p.m.

10:39 p.m. — Later than proposed at 6 p.m., but more than five hours ahead of the original schedule, Armstrong opens the LM hatch and squeezes through the opening. It is a slow process. He moves slowly down the 10-foot, nine-step ladder. On reaching the second step, he pulls a "D-ring," which deploys a tv camera, so that millions back at Earth can see him step on the lunar surface.

10:56 p.m. — Armstrong puts his left foot on the Moon. "That's one small step for a man, one giant leap for Mankind," Armstrong radios.

11:11 p.m. — Aldrin emerges from the "Eagle" while Armstrong photographs him.

11:41 p.m. — Both astronauts erect the American flag on the lunar surface.

11:48 p.m. — President Nixon talks to Armstrong and Aldrin from the

White House. "Because of what you have done, the heavens have become a part of Man's world. As you talk to us from the Sea of Tranquility, it inspires us to redouble our efforts to bring peace and tranquility to Earth. For one priceless moment, in the whole history of Man, all the people on this Earth are truly one," said the President.

Monday, July 21

12:54 a.m. — After check with Mission Control to make sure all chores had been completed, Aldrin starts back up the ladder to re-enter the LM.

1:09 a.m. — Armstrong joins Aldrin in the "Eagle."

1:54 p.m. — Ascent engine is started, and LM, using descent stage as a launch pad, begins rising and reaches a vertical speed of 80 feet per second at an altitude of 1,000 ft.

5:35 p.m. — "Eagle" redocks with Columbia while circling on the back side of the Moon.

7:42 p.m. — The "Eagle" is jettisoned.

Tuesday, July 22

12:56 a.m. — While on the back side of the Moon, the Command-Service Module begins leaving Moon orbit and starts its return trip home.

Wednesday, July 23

3:56 p.m. — Spacecraft passes midway point of journey home.

Thursday, July 24

12:21 p.m. — Command and Service Modules are separated.

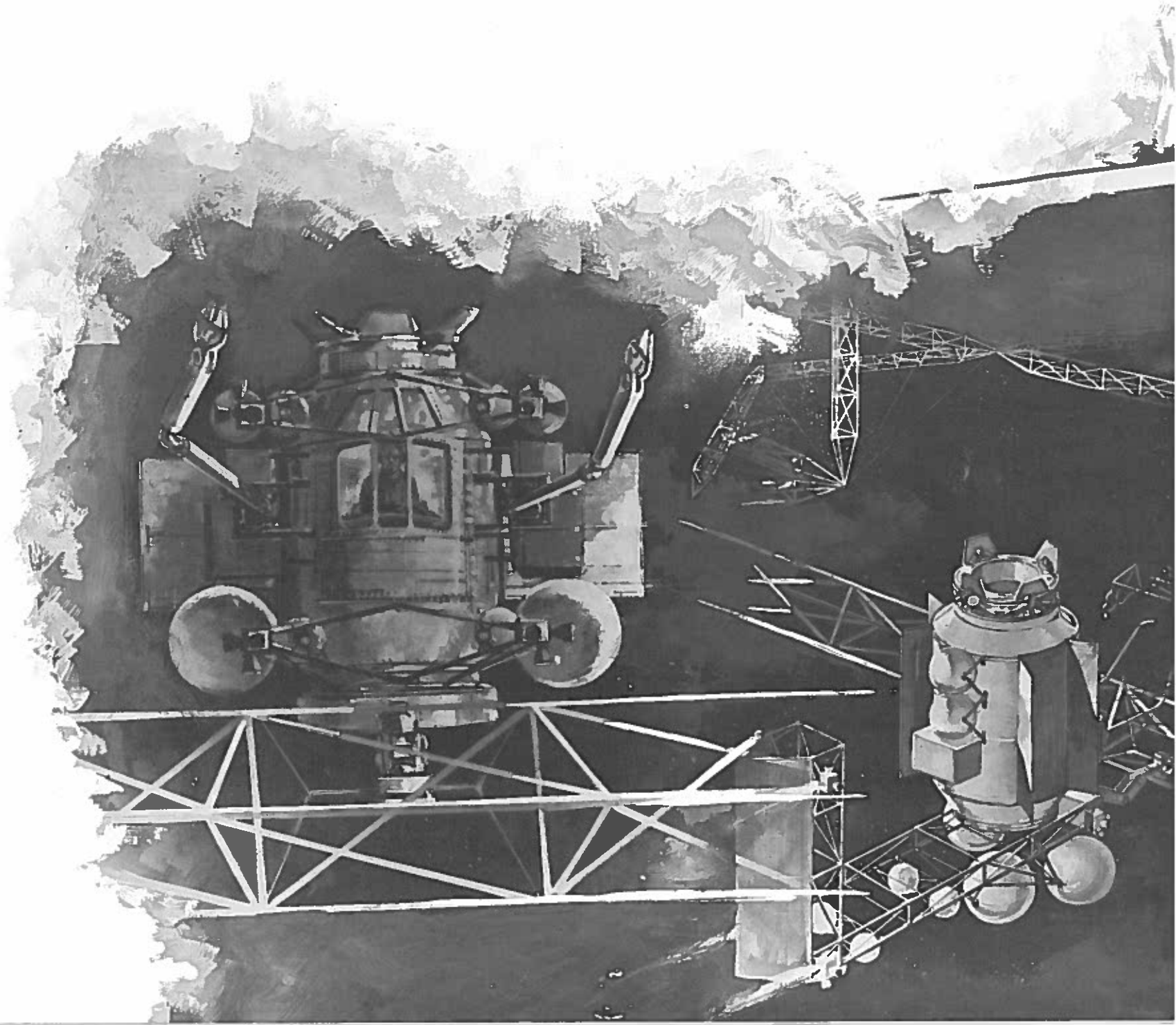
12:35 p.m. — Command Module re-enters the Earth's atmosphere.

12:51 p.m. — Spacecraft splashes down 825 nautical miles southwest of Honolulu and about 13 miles from the recovery ship, the U.S.S. Hornet.

So ends man's first mission to the Moon. It has lasted 195 hours, 18 minutes and 35 seconds; a little more than eight days. It is recognized as the most trouble-free mission to date, almost completely on schedule and successful in every respect.

Beyond Apollo

**Grumman provides tools
for space construction**



It was a brief flirtation.

Beginning with Mercury, followed by Gemini, and culminating with Apollo, we touched the heavens.

But in the vastness of space we barely left a mark. And the accomplishments of Apollo are only a hint of what lies ahead.

The disciplines and technologies of our lunar explorations have expanded our dreams and improved our lives. And now the Space Shuttle is about to make space travel routine.

"The near-term future of space will be tied to the Shuttle," says Fred Haise, former Apollo astronaut and Shuttle pilot, who is now Grumman Aerospace

vice president-Space Programs. "This program will focus on development of satellite systems for energy generation, communication, navigation, earth resource and weather monitoring, and defense surveillance."

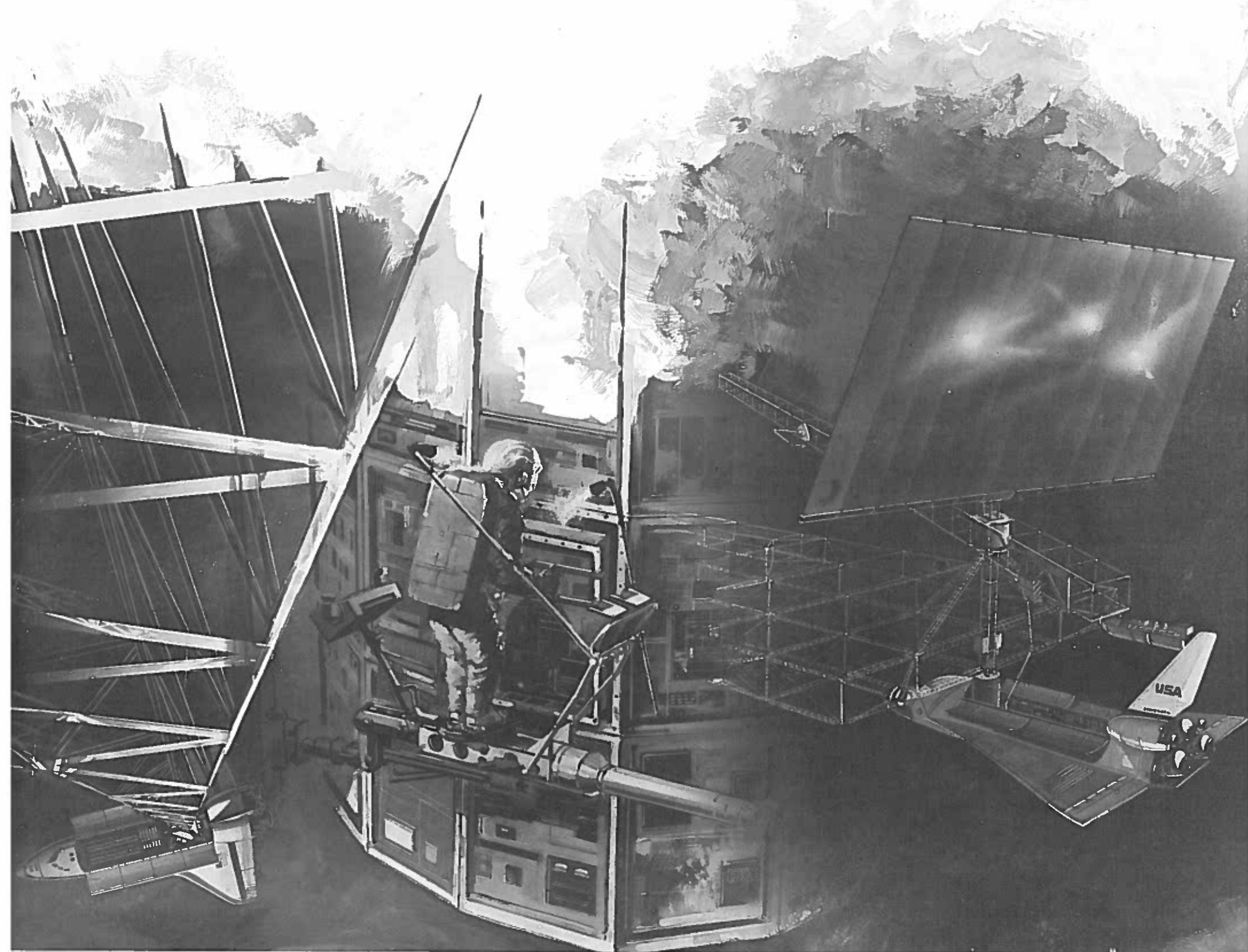
Haise points out that Grumman is not only deeply involved in NASA study contracts to design these systems, but is also a leader in developing the tools needed to build large structures in space.

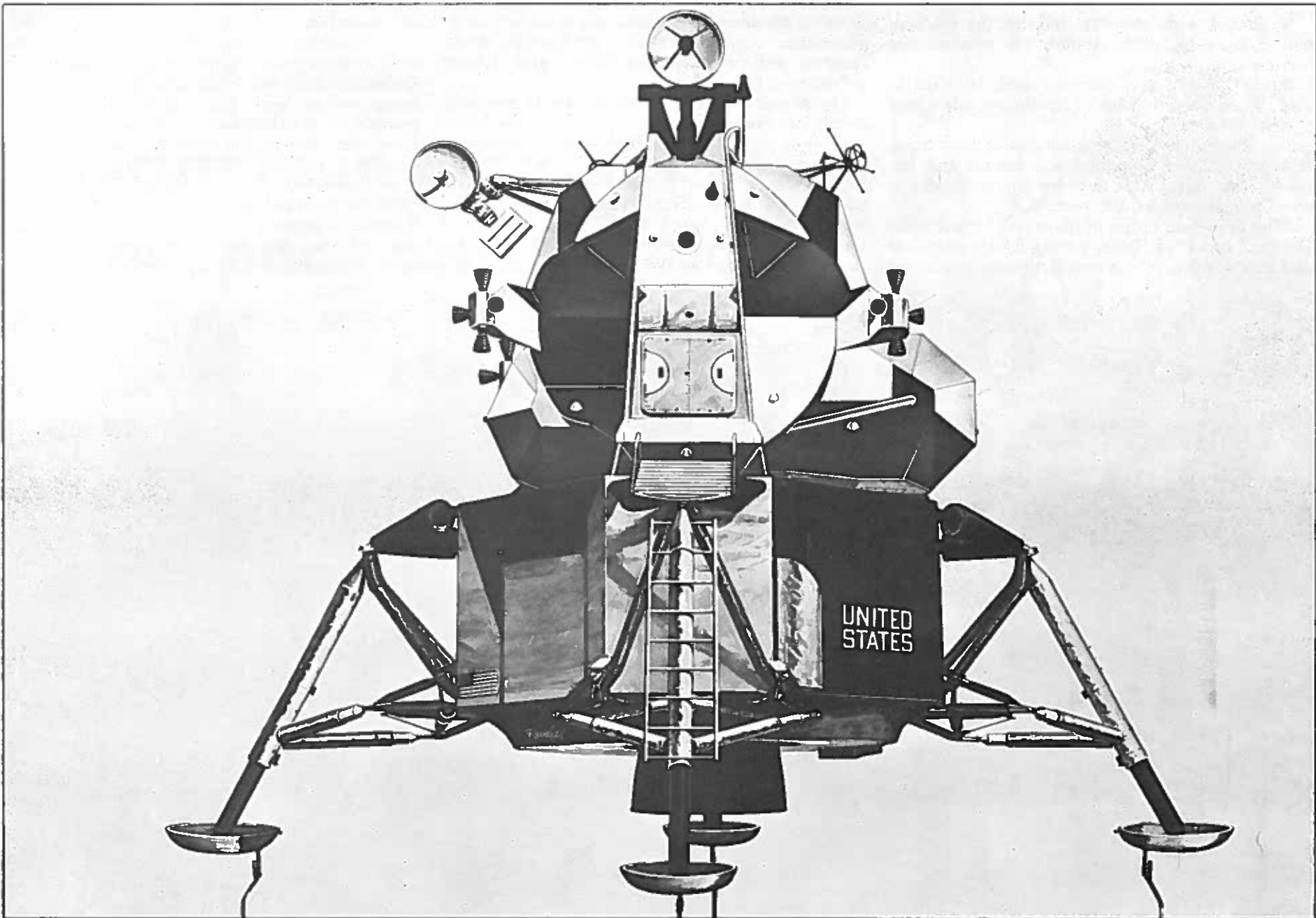
Grumman's beam builder, which will form construction beams from the cargo bay of the Shuttle, is now being tested by NASA. And Grumman engineers are now refining designs for the Manned Remote Work Station, or cherry

picker, which will enable astroworkers to build structures from the beams.

With further exploration and exploitation, man may colonize space before the turn of the century. Grumman studies indicate that by the 1990's the beam builder and cherry picker may make it possible for us to build an Early Space Construction Base where five people could live and work for 90 days at a time.

At Grumman and throughout the world, we continue to build on the foundations of Apollo. When man stepped onto the Moon, we learned that we could travel as far as our determination and imagination would carry us.





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